

What is claimed is:

1. A method for temporarily protecting glass from glass chips and/or scratching, said glass having at least one substantially flat surface, said method comprising:

(A) protecting the surface by:

- (i) applying an aqueous solution comprising at least one polysaccharide to the surface, said surface having a contact angle less than or equal to 8° prior to the application of said aqueous solution; and
- (ii) removing water from the aqueous solution to leave a polysaccharide-containing coating on the surface having a thickness of at least 0.01 microns; and

(B) subsequently removing the polysaccharide-containing coating from surface using an aqueous solution;

wherein the surface has a contact angle after step (B) which is less than or equal to 8°.

2. The method of Claim 1 wherein after step (B), the surface has a RMS surface roughness as measured by atomic force microscopy which is less than or equal to 0.36 nanometers.

3. The method of Claim 1 wherein the at least one polysaccharide comprises straight chain polysaccharide molecules and branched polysaccharide molecules.

4. The method of Claim 1 wherein the at least one polysaccharide comprises at least one starch.

5. The method of Claim 4 wherein the at least one starch comprises straight chain starch molecules and branched starch molecules.

6. The method of Claim 1 wherein step (A) is performed as part of the manufacturing process for the glass.

7. The method of Claim 6 wherein the manufacturing process produces newly formed glass at an elevated temperature and steps (A)(i)

and (A)(ii) are performed substantially simultaneously by applying the aqueous solution to the newly formed glass at a point in the manufacturing process where the temperature of the newly formed glass just prior to contact with the aqueous solution is above 150°C.

8. The method of Claim 7 wherein the temperature of the newly formed glass just prior to contact with the aqueous solution is below 300°C.

9. The method of Claim 7 wherein the temperature of the newly formed glass just prior to contact with the aqueous solution is below 250°C.

10. The method of Claim 7 wherein the glass is vertical in step (A) and the temperature of the glass remains sufficiently high throughout step (A) so that drips do not form on the surface.

11. The method of Claim 10 wherein the temperature of the glass is at least 100°C at the end of step (A).

12. The method of Claim 1 wherein in step (A)(i), the aqueous solution is applied to the surface by spraying.

13. The method of Claim 1 wherein in step (A)(i), the aqueous solution is heated before being applied to the surface.

14. The method of Claim 1 comprising the additional steps between steps (A) and (B) of:

(a) cutting the glass; and

(b) grinding and/or polishing at least one edge of the cut glass;

wherein:

water or a water-containing solution is applied to the coated surface during at least one of steps (a) and (b);

the surface of the coating has a first contact angle prior to steps (a) and (b) and a second contact angle after steps (a) and (b); and

the first and second contact angles differ by less than 5°.

15. The method of Claim 1 wherein the concentration of the polysaccharide in the aqueous solution of step (A)(i) is between 0.1 weight percent and 30 weight percent.

16. The method of Claim 1 wherein the viscosity of the aqueous solution of step (A)(i) is between 0.1 centipoise and 100 centipoise.

17. The method of Claim 1 wherein the aqueous solution of step (A)(i) comprises a biocide.

18. The method of Claim 1 wherein the aqueous solution of step (A)(i) comprises a plasticizer.

19. The method of Claim 1 wherein the polysaccharide-containing coating has a thickness of less than 50 microns.

20. The method of Claim 1 wherein polysaccharide-containing coating has a thickness of between 0.1 microns and 20 microns.

21. The method of Claim 1 wherein the aqueous solution of step (B) comprises a detergent.

22. The method of Claim 1 wherein step (B) comprises one or more of: heating the aqueous solution of step (B), applying ultrasonic energy to the coating, and/or brush washing the surface.

23. The method of Claim 1 wherein the coating reduces the number of glass chips adhered to the surface by at least 90 percent compared to the number of glass chips adhered to an uncoated surface under comparable conditions.

24. The method of Claim 23 wherein the number of glass chips adhered to the surface is reduced by at least 95 percent.

25. The method of Claim 1 wherein the glass has two substantially flat surfaces and the coating is formed on both surfaces in step (A).

26. The method of Claim 1 wherein after step (B), the glass is used to make a liquid crystal display.

27. An article of manufacture comprising:

(a) a glass sheet having at least one substantially flat surface; and  
(b) a coating comprising at least one polysaccharide on the surface, said coating having a thickness of at least 0.01 microns;

wherein:

(i) the coating protects the surface from glass chips and/or scratching; and

(ii) the coating is removable from the surface through the application of an aqueous solution.

28. The article of Claim 27 wherein:

prior to application of the coating, the surface has a contact angle less than or equal to 8°; and

the coating is sufficiently removable so that the contact angle of the surface after removal of the coating is less than or equal to 8°.

29. The article of Claim 27 wherein after removal of the coating, the surface has a RMS surface roughness as measured by atomic force microscopy which is less than or equal to 0.36 nanometers.

30. The article of Claim 27 wherein the at least one polysaccharide comprises straight chain polysaccharide molecules and branched polysaccharide molecules.

31. The article of Claim 27 wherein the at least one polysaccharide comprises at least one starch.

32. The article of Claim 31 wherein the at least one starch comprises straight chain starch molecules and branched starch molecules.

33. The article of Claim 27 wherein the coating comprises a biocide.

34. The article of Claim 27 wherein the coating comprises a plasticizer.

35. The article of Claim 27 wherein the coating has a thickness of less than 50 microns.

36. The article of Claim 27 wherein the coating has a thickness of between 0.1 microns and 20 microns.

37. The article of Claim 27 wherein the coating reduces the number of glass chips adhered to the surface by at least 90 percent compared to the number of glass chips adhered to an uncoated surface under comparable conditions.

38. The article method of Claim 37 wherein the number of glass chips adhered to the surface is reduced by at least 95 percent.

39. The article of Claim 27 wherein the glass comprises two substantially flat surfaces, both surfaces have a coating comprising at least one polysaccharide, and each of the coatings has a thickness of at least 0.01 microns.

40. The article of Claim 27 wherein the glass is suitable for use as a substrate for a liquid crystal display.